

REMARKS

The Examiner's Action mailed on December 4, 2008, has been received and its contents carefully considered. A Request for Continued Examination is filed herewith under 37 CFR §1.114.

In this Amendment, Applicants have amended claim 3. Claim 3 is the sole independent claim, and claims 2-7 remain pending in the application. For at least the following reasons, it is submitted that this application is in condition for allowance.

Claims 2-4 were rejected under 35 USC §103(a) as obvious over the combination of *Kane* (US 4,381,566) with *Holshouser et al.* (US 6,229,489 B1). This rejection is respectfully traversed.

In an antenna according to claim 3, the first antenna element and the second antenna element are electrically connected to each other in series and are arranged such that transmission/reception in a first frequency band is enabled by further connecting them to a feeding part through the tuning circuit connected in series thereto, such that transmission/reception can be performed in a second frequency band which is different from the first frequency band by connecting only the first antenna element directly to the feeding part without the tuning circuit being interposed therebetween.

In other words, in this arrangement, while using a wide band radiation element, to which the tuning circuit is connected in series, signals of the second

frequency band other than the first frequency band can be transmitted/received without the tuning circuit being interposed therebetween.

More particularly, claim 3 recites that "the radiation element comprises a first antenna element and a second antenna element connected to each other electrically in series, *one end of the second antenna element that is opposite to the first antenna element being connected to a feeding part through the tuning circuit*, the first antenna element and the second antenna element being formed in an electric length so as to resonate at a frequency within the desired frequency band by the total length, and so as to resonate at a *first frequency band of a wide band in the desired frequency band with the tuning circuit*, and a connecting part of the first antenna element and the second antenna element being directly connected to the feeding part without the tuning circuit, *so as to resonate at a second frequency band, which is different from the first frequency band, and to be non-resonant in the first frequency band, by only the first antenna element*".

In contrast, *Kane* discloses a dipole antenna using a pair of distributed constant inductance elements, and considers the impedance of the whole antenna.

The Office Action admits that *Kane* fails to teach "the radiation element comprises a first antenna element and a second antenna element connected to each other electrically in series, the first antenna element and the second antenna element being formed in an electric length so as to resonate at a frequency within the desired frequency band by the total length, and so as to resonate at a first

frequency band of a wide band in the desired frequency band with the tuning circuit, and so as to resonate at a second frequency band by only the first antenna element", and relies upon *Holshouser et al.* to supply this deficiency.

The Response to Arguments asserts on page 6 of the Office Action, referring to FIG. 4A of *Holshouser et al.*, that column 4, lines 16-18 thereof states that "in the extended position, the antenna 10 performs as a half-wavelength monopole with a small series reactance at 800 MHz ...", and that column 4, lines 20-24 states that "in a retracted position, the helical coil 17 of the antenna 10 performs ... as a quarter-wave monopole at 1900 MHz with the parasitic element 18". In fact, the whole paragraph (column 4, lines 16-31) reads as follows:

Accordingly, *in the extended position, the antenna 10 performs as a half-wave monopole with a small series reactance at 800 MHz and as a half-wave monopole at 1900 MHz. In the retracted position, the helical coil 17 of the antenna 10 performs as a quarter-wave monopole at 800 MHz and as a quarter-wave monopole at 1900 MHz with the parasitic element 18.* In the retracted position as illustrated in FIG. 5, the linear rod 12 is effectively electrically disconnected from the helical coil so that energy is not permitted to leak down the linear rod and be absorbed by the radiotelephone user's hand. Accordingly, the present invention can provide a radiotelephone antenna with half-wave monopole performance at 800 MHz and half-wave monopole performance at 1900 MHz without requiring a complex mechanical structure.

(emphasis added)

Thus, when these quotes are read in their full context, we can see that the antenna of *Holshouser et al.* actually resonates in *both* bands in *both* the extended and retracted positions.

In *Holshouser et al.*, a parallel resonant trap **22** is interposed between a first antenna element (helical coil **17**) and a second antenna element (linear rod **12**). This trap is arranged in that its impedance changes depending on the frequency. Utilizing this change in impedance, resonance is caused at two frequency bands. More particularly, at 800 MHz, the impedance is small and corresponds to a serial connection, and at 1900 MHz, the impedance is large and the arrangement does not utilize the helical coil **17**. As a result, the antenna operates on both frequency bands, that is, at both 800 MHz and 1900 MHz, in a condition in which the antenna is extended.

Further, referring again to column 4, lines 16-31 as reproduced above, *Holshouser et al.* includes a parasitic element **18** in addition to the first antenna element **17** and the second antenna element **12**. The action of this parasitic element varies **18** depends on the frequency, and when the antenna is in a retracted condition, the antenna operates at 800 MHz while using the helical coil **17** only, and at 1900 MHz, the antenna utilizes the helical coil **17** and the parasitic element **18**. Accordingly, the antenna also operates on both the 800 MHz and 1900 MHz frequency bands in the retracted condition, as well as in the extended condition.

In other words, in *Holshouser et al.*, the antenna resonates, when in the extended condition, in both of the two frequency bands, namely 800 MHZ and 1900 MHz by the action of the parallel resonant trap **22** while with the antenna in

the retracted condition, it still resonates at both 800 MHz and 1900 MHz, respectively, by using the helical coil 17 only or by using the helical coil 17 and the parasitic element 18. Accordingly, the antenna operates in the same two frequency bands of 800 MHz and 1900 MHz regardless of whether the antenna is in the extended or the retracted condition, and thus there is no teaching or suggestion of an antenna like that of the present invention which is arranged to operate at different frequency bands when in the extended and retracted conditions.

Further *Holshouser et al.* does not teach or suggest "one end of the second antenna element that is opposite to the first antenna element being connected to a feeding part through the tuning circuit". If the trap 22 is taken to be the claimed tuning circuit and the matching network 20 is taken to be the claimed feeding part, then in the extended position shown in FIG. 3 the matching network 20 is connected directly, without trap 22, to an end of the rod 12 opposite the helical coil 17, and in the retracted position shown in FIG. 5, the matching network 20 is connected through trap 22 to an end of the helical coil 17 nearest to the rod 12, neither of which connections correspond to the above recited feature of claim 3.

Moreover, *Holshouser et al.* does not disclose connecting with a tuned circuit only when the antenna is in an extended condition, and it does not disclose connection through the tuned circuit at all, and while *Kane* discloses connection with a tuned circuit, it neither discloses nor suggests an arrangement in which

connection with the tuned circuit is established when the antenna is in an extended condition but that the tuning circuit is not routed through the tuning circuit when the antenna is retracted.

Therefore *Kane* and *Holshouser et al.*, whether taken separately or in combination, fail to teach or suggest a variable tuning antenna with first and second antenna elements in series, where “*one end of the second antenna element that is opposite to the first antenna element being connected to a feeding part through the tuning circuit*, the first antenna element and the second antenna element being formed in an electric length so as to resonate at a frequency within the desired frequency band by the total length, and so as to resonate at a first frequency band of a wide band in the desired frequency band with the tuning circuit” and “*a connecting part of the first antenna element and the second antenna element being directly connected to the feeding part without the tuning circuit, so as to resonate at a second frequency band, which is different from the first frequency band, and to be non-resonant in the first frequency band*, by only the first antenna element” (*emphasis added*) as recited in claim 3.

Therefore *Kane* and *Holshouser et al.* fail to teach or suggest all the features recited in claim 3. Thus, claim 3 is allowable, together with claims 2 and 4-7 that depend therefrom.

Claims 5 and 6 were rejected under 35 USC §103(a) as obvious over the combination of *Kane* with *Holshouser et al.* and *Ryou et al.* (US 7,132,998 B2). This rejection is respectfully traversed.

Claim 5 depends from claim 3, and as *Ryou et al.* fails to remedy the deficiencies of *Kane* and *Holshouser et al.* with respect to claim 3, claim 5 is also allowable. Claim 6 depends from claim 5, and is therefore allowable for at least the same reasons that claim 5 is allowable.

Ryou et al. discloses a triple band antenna, but the Office Action does not allege that *Ryou et al.* discloses a variable tuning antenna with first and second antenna elements in series and formed "so as to resonate at a first frequency band of a wide band in the desired frequency band with the tuning circuit" and "so as to resonate at a second frequency band, *which is different from the first frequency band, and to be non-resonant in the first frequency band*, by only the first antenna element" (*emphasis added*) as recited in claim 3.

Claim 6 recites a specific structural example in which an antenna according to a preferred embodiment of the invention is applied to a portable wireless device. Concrete coupling structures are recited in which connection with the feeding part is established through the tuning circuit, and also in which connection is established without the tuning circuit. None of the cited references discloses the combination of an antenna having a tuning circuit which has a wide band and an antenna which performs as a different frequency band using only a first antenna element which is a part of the wide band antenna.

Claim 6 is therefore also allowable for at least the above additional reason.

Claim 7 was rejected under 35 USC §103(a) as obvious over the combination of *Kane* with *Holshouser et al.*, *Ryou et al.* and *Kanayama et al.* (US 5,861,859). This rejection is respectfully traversed.

Kanayama et al. discloses two helical antennas. However, when the antenna assembly **12** is extended from the housing body **2**, the rod antenna **11A** and the helical antenna **11B** are serially connected and operate as a single antenna, and when the antenna assembly **12** is in the retracted state, the second helical antenna **12A** and the helical antenna **11B** on the main body side are serially connected and operate as a single antenna. That is, it is neither disclosed nor suggested in the above reference to operate the two helical antennas **11A** and **12A** individually in the same frequency band.

Therefore, none of the cited references, whether taken separately or in combination, teach or suggest a variable tuning antenna with first and second antenna elements in series and formed "so as to resonate at a first frequency band of a wide band in the desired frequency band with the tuning circuit" and "so as to resonate at a second frequency band, *which is different from the first frequency band, and to be non-resonant in the first frequency band*, by only the first antenna element" (*emphasis added*) as recited in claim 3.

Claim 7 also depends indirectly from claim 3, and as *Ryou et al.* and *Kanayama et al.* fail to remedy the deficiencies of *Kane* and *Holshouser et al.*

with respect to claim 3, claim 7 is also allowable for at least the reasons that claim 3 is allowable.

It is submitted that this application is in condition for allowance. Such action and the passing of this case to issue are requested.

Should the Examiner feel that a conference would help to expedite the prosecution of this application, the Examiner is hereby invited to contact the undersigned counsel to arrange for such an interview.

Should any fee be required, however, the Commissioner is hereby authorized to charge the fee to our Deposit Account No. 18-0002, and advise us accordingly.

Respectfully submitted,



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Date

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AMENDMENT

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